

CLAIMS:

1. An ion source for a mass spectrometer which operates at a low pressure comprising:

- 5 an atmospheric pressure sample ioniser operable at atmospheric pressure to provide a sample flow containing desired sample ions;
- 10 an interface chamber having an entrance aperture, an exit aperture and an exhaust port, the entrance aperture being arranged to receive sample ions provided by the atmospheric pressure sample ioniser entrained in a gas flow, and the exit aperture being arranged for sample ions to exit the interface chamber to the mass spectrometer; and
- 15 a vacuum pump in communication with the exhaust port of the interface chamber to hold the pressure thereof at a pressure intermediate the operating pressure of the mass spectrometer and atmospheric pressure; the interface chamber defining a flow passage for gas and entrained sample ions from the
- 20 entrance aperture to the exhaust port, the exit aperture being located in the flow passage between the entrance aperture and the exhaust port, wherein the flow passage is shaped to cause substantially all the gas and entrained sample ions entering the entrance
- 25 aperture to flow within a distance "d" of the exit aperture, where d is less than five times the diameter of the exit aperture, and to provide no line of sight between the entrance and exit apertures.

- 30 2. An ion source as claimed in claim 1, in which the interface chamber has a bend therein to introduce turbulence into the flow of gas and entrained sample ions as they flow along the said flow passage, the bend being formed between the said
- 35 entrance aperture and the said exit aperture.

3. An ion source as claimed in claim 1 or claim 2, in which the interface chamber has a first passage adjacent the entrance aperture, and a second

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passage adjacent the exit aperture, the first and second passages communicating with each other and intersecting at an angle of approximately 90° to each other such that the intersection lies between the said entrance and exit apertures.

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4. An ion source as claimed in claim 1, in which a part of the interface chamber between the entrance and exit apertures is of smaller sectional area than the remainder of the interface chamber such that the net flow of sample ions between the entrance and exit apertures is throttled.

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5. An ion source as claimed in claim 3, in which the first passage adjacent the entrance aperture is of smaller sectional area than that of the second passage adjacent the exit aperture such that the net flow of sample ions between the entrance and exit apertures is throttled.

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6. An ion source as claimed in claim 3 or claim 5, in which both the first passage and the second passage have a length substantially longer than their respective widths.

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7. An ion source as claimed in any one of the preceding claims, in which the exit aperture comprises a frusto-conical hole formed within a block defining the interface chamber, the exit aperture further comprising a correspondingly frusto-conical insert member, the insert member having a bore therethrough to permit passage of sample ions and being coaxially aligned with the frusto-conical hole in the block.

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8. An ion source as claimed in claim 7, in which the insert member is electrically insulated from the block.